# "AN EXPLORATIVE STUDY OF WATER ECONOMY IN RURAL-URBAN SETTLEMENTS: SPECIAL REFERENCE TO MARATHWADA REGION OF MAHARASHTRA STATE (2010 - 2022)"

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**"An Explorative Study of Water Economy in Rural-Urban Settlements: Special Reference to Marathwada Region of Maharashtra State (2010 - 2022)"**

## Background of the study

India has 17 percent of the world's population, 2.42 percent of the world's land resources, and 4 percent of the world's freshwater resources (Census. 2011, Planning Commission.2002). The monsoon rain is the primary source of water in India. India has a seasonal pattern of rainfall. The rainfall in India is uneven and erratic. Over 90 percent of the rivers in India flow during the monsoon rain only (World Bank. 2005. Executive Summary:4). Many reservoirs and irrigation projects hold the rainwater, and it gets utilised for the supply of drinking water too, apart from the agricultural and industrial supply.

Safe drinking water is a fundamental need of human beings. The responsibility of the supply of safe drinking water is carried by the civic bodies of the concerned rural and urban settlements except for remote village habitations. Civic bodies have their monitoring system and a massive infrastructure of water supply. The drinking water supply is mainly dependent on water stock in nearby water reservoirs or irrigation projects. Yearly rainfall in the area is the solitary water source for these reservoirs or projects. If the rain is not good, the stock of water declines, affecting the civic bodies' water supply. If less rainfall continues, water scarcity becomes a significant obstacle in the development process, culminating in the economic imbalance of any urban or rural settlement.

## Review of Literature

There are significant studies conducted on different aspects of available water in India. (Dewes, 2018), provided useful background information and reference materials to explain the different approaches and interventions that are used for water management and to reduce water losses. Devas and S.N. Sriharsha highlighted many aspects of water and described water resource management in their work. (Goel, 2008), assessed water pollution and the controlling of water pollution, more specifically groundwater and surface water. He emphasized controlling non-point source pollution, best management practices, and an integrated management approach. He

also focussed on the cause, effect, and remedies of water pollution. (Mukherjee, 2016), Provided insights on agroforestry which provides valuable goods and services to the farmers. He worked on the substantial improvement of the economic and resource sustainability of agriculture. (Garara, 2015), worked on irrigation water management and soil conservation. (Chauhan, 2016), worked on the socio-economic impact of drought. In his work, he provided appropriate techniques for the drought-prone areas to avoid its inverse impact due to drought.

(Pani, 2015), worked on drinking water in rural areas. He addressed the major issues like sustainability, water availability, and supply, poor water quality, etc. He analyzed different aspects of managing drinking water in rural India. (Upadhyay, 2017), worked on modern water control and management practices in irrigation. He mainly highlighted the causes of the decline in the groundwater level and its socio-economic impact on rural development in India. (Kumar, 2014) evaluated a watershed development program in a drought-prone area of Palamau, Jharkhand. (Gautam, 2012), worked on managing water-related disasters. In his analysis, he provided a comprehensive overview of water-related disasters and their management. (Sheeba, 2012), Worked on the sustainability of water resources and the growing imbalance in availability and demand for drinking water. She highlighted the commodification of water and its environmental impact in terms of water extraction.

(Noor, 2012) worked on managing the environment and controlling water pollution. She has also focussed on health issues arising out of environmental degradation and water pollution. (Sharma, 2017) worked on water pollution due to various chemicals available in the environment and its effects on human as a whole. He has also proposed some measures to control the water pollution.

Apart from these studies there are some studies which are focussed on water economy in Maharashtra and especially Marathwada region. These studies includes (Diwan, 2005), (Prakash, 2017), (Dandekar, 2013), (Ravi, 1995), (Purandare, 2013),

These research endeavours focus on different types of water problems in Indian territory. Some of the discussions are on the availability of water, water provision related issues, distribution of water, degradation of water quality, irrigation facilities, water conservation, water supply in metropolitan cities, water pricing, water harvesting and water scarcity management, etc. These research works are helpful in understanding different dimensions of water issues in India.

**Research Gap:**

Research conducted previously explored different dimensions related to water such as availability of water, accessibility of water, water conservation, water harvesting and water management, etc. These studies have mainly focused on the issues considering government as the sole authority of water supply and administration. These studies are significant to the nation but confined to either developed regions, metropolitan cities or only rural parts of India. There is hardly any comparative study on rural-urban settlements from any backward region. There is no specific study on parallel water economy developed in the rural-urban settlements in any region. Also, an influence on household expenditure due to the water economy has not found addressed in the previous works. There is a need to address the water economy issues that exist in the rural and urban settlements from the backward regions of India. Considering this research gap, the present study will attempt to explore the status of the water economy in the rural-urban settlements from the backward region of Maharashtra, i.e. Marathwada region.

**Significance of the Study**

This study considers 'water economy' as an essential parameter. Water economy refers to economic activities associated with 'water' such as demand and supply of water, consumption pattern of water, pricing of water, consumption expenditure on water, different sources of water, distribution of water, availability, accessibility, conservation, and sustainability of water, etc. This study explores the water economy's different social and economic aspects in rural-urban settlements from the backward region of Maharashtra, i.e. Marathwada region.

**Why is the Marathwada region as a Study Area?**

The Marathwada region of Maharashtra State has been chosen for this study because it is located in a rain shadow area of Maharashtra State and faces drought very frequently. There are six divisions in Maharashtra State. 'Aurangabad Division' is one of the divisions known for its backwardness in many aspects. 'Aurangabad Division' is known as 'Marathwada' in Maharashtra State. There are eight districts in this region (i.e. Hingoli, Osmanabad, Nanded, Jalna, Latur, Parbhani, Beed, Aurangabad). The issues associated with the 'water' are almost homogenous in all eight districts.

According to the Maharashtra Human Development Report (MHDR) of 2012, five districts from the Aurangabad division stands in Low Human Development Index (HDI) namely, Hingoli (0.648), Osmanabad (0.649), Nanded (0.657), Jalna (0.663), and Latur (0.663), two stands in Medium HDI category namely, Beed (0.678) and Parbhani (0.683) and one stand in High HDI category namely Aurangabad (0.727). Among nine Low HDI districts in MHDR (2012), five districts are alone from the Marathwada region.

The present study proposes to conduct an explorative study on the status of the water economy in the mentioned backward region, which is located in the rain shadow area of Maharashtra and faces frequent droughts. This study will contribute to the present literature highlighting the status of the water economy in rural and urban settlements separately. Further, it will try to identify an imbalance in the water economy. In addition, it will put forward the other effects developed out of the present water economy issues. The study outcomes would be helpful to the researchers in economics, other social sciences, and urban planners.

**Research Problem:**

There is an imbalance in the water demand and water supply by civic bodies. It led to some substitute parallel systems of water supply that have been developed in recent times in different regions. These other units do not have a vast infrastructure. Still, they can supply safe drinking water with their conservation, distribution, and management that too on a daily or on-demand basis. However, these units are also dependent on the rainfall for the availability of water or other means. The paradox is, Civic bodies with colossal infrastructure and human resources are not in a condition to supply sufficient potable water. In contrast, private water plants can supply it daily or demand, charging specific prices. Both Civic units and private units are functioning in the same drought-prone regions. So cost and benefit of 'Water Economy' is needed to be addressed. An unorganised parallel water supply system and the over-exhausted government system led to the imbalance in the water economy of the rural-urban settlements. The present study is an attempt to address the problem of imbalances in the water economy among rural-urban settlements in the Marathwada Region of Maharashtra.

**Objectives:**

Objectives of the present study are as follows:

1. To study, analyse and find out the current status of the water economy in the rural and urban settlements in the Marathwada region.
2. To investigate the imbalance in the water economy among rural-urban settlements and the factors responsible for it
3. To explore types of effects out of imbalance in water economy among rural-urban settlements
4. To highlight the pros and cons of the water economy in the Marathwada region, suggesting some remedies to the water problem in the area.

**Hypothesis**

Present study attempt to investigate whether is there any significant difference in the 'water economy' among rural and urban settlements. And to investigate this, the study framed the following null hypotheses:

($H_0$): There is no significant difference in the sources of the water among rural-urban settlements

($H_0$): There is no significant difference in the requirement of water and accessibility of water among rural-urban settlement

($H_0$): There is no significant difference in the consumption pattern of water among rural-urban settlement

($H_0$): There is no significant difference in the household expenditure on the water among rural-urban settlement

**Proposed Test Statistic:**

To test the hypothesis, the present study proposes to use tstat, Fstat (ANOVA) and Chi-Square test.

**Operational Definitions:**

The present study will use terminologies such as 'water economy', 'rural', 'urban'. Definition of these terminologies are as follows:

- **Water Economy:** Water economy refers to economic activities associated with 'water' such as demand and supply of water, consumption pattern of water, pricing of water, household expenditure on water, different sources of water, distribution of water, availability, accessibility, conservation and sustainability of water, etc.
- **Rural-Urban:** The unit of classification in the rural-urban area is 'town' for urban areas and 'village' for rural areas. The urban area comprises two types of towns viz: Statutory towns and Census towns.

1)**Statutory towns**: All paces with municipality, corporation, cantonment board or notified town area committee, etc. are known as Statutory towns.

2) **Census towns**: All other places satisfying the following three criteria simultaneously are treated as Census Town:

i.) A minimum population of 5000:

ii.) At least 75% male working population in non-agricultural pursuits:

iii.) A density of population of at least 400 per sq km. (1000 per sq. mile)

- All area other than urban is 'rural'

**Proposed Variables in the study:**

The present study will take into the consideration following variables such as sources of water, requirement/need of water, availability of water, accessibility of water, consumption pattern of water, household expenditure on water, quality and quantity of water, distribution of water, etc. The data on these variables will be collected to investigate and explore the status of the water economy in the rural-urban settlements in the Marathwada region of Maharashtra State.

**Research Methodology:**

The present study will be analytical in nature. This study is an attempt to investigate and explore the imbalance of the water economy among rural and urban settlements from the backward region of Maharashtra State i.e. Marathwada region.

**Population of the Study:**

All the households from eight districts (Aurangabad, Jalna, Osmanabad, Bid, Latur, Parbhani, Nanded, Hingoli) is the Population of the Study. Table 1.1 represents the district wise population of the study.

**Table 1.1: Population of the Study**

| District | Rural Household | Urban Household | Total Household |
|---|---|---|---|
| Aurangabad | 420950 | 330965 | 751915 |
| Jalna | 320908 | 70793 | 391701 |
| Beed | 435588 | 100247 | 535835 |
| Osmanabad | 296494 | 54787 | 351281 |
| Latur | 363409 | 118163 | 481572 |
| Nanded | 494341 | 171093 | 665434 |
| Parbhani | 256399 | 104731 | 361130 |
| Hingoli | 196255 | 32613 | 228868 |

**Source:** Different District Census Handbooks

**Proposed Sample Size of the Study:**

Sample size for the study is determined using 'statistical analysis requirements sample size specification' formula.

$$n = \frac{z^2 \times \frac{p(1-p)}{c^2}}{1 + \left(z^2 \times \frac{p(1-p)}{c^2 \times N}\right)}$$

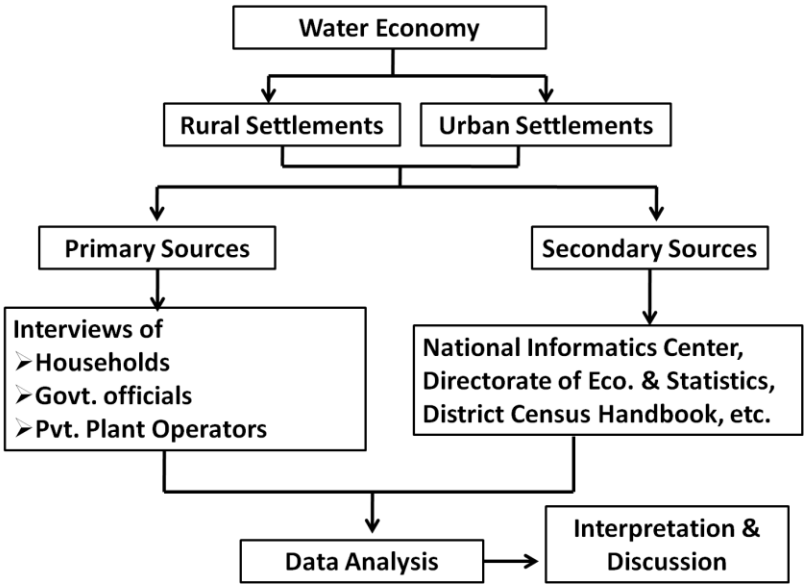
Using above formula sample size for each district is determined. Further, proportionate sampling technique used to determine the sample size of rural and urban settlements as shown in the following table:

**Table 1.2: Proportionate Sample of Rural and Urban Settlements in Marathwada Region**

| District | Rural Household (Sample Size) | Urban Household (Sample Size) | Total Household (Total Sample) |
|---|---|---|---|
| Aurangabad | 420950 (215) | 330965 (169) | 751915 (384) |
| Jalna | 320908 (315) | 70793 (69) | 391701 (384) |
| Bid | 435588 (312) | 100247 (72) | 535835 (384) |
| Osmanabad | 296494 (324) | 54787 (60) | 351281 (384) |
| Latur | 363409 (290) | 118163 (94) | 481572 (384) |
| Nanded | 494341 (285) | 171093 (99) | 665434 (384) |
| Parbhani | 256399 (273) | 104731 (111) | 361130 (384) |
| Hingoli | 196255 (329) | 32613 (55) | 228868 (384) |
| Total | 2784344 (2343) | 983392 (729) | 3767736 (3072) |

**Research Degin:**

Proposed research design of the study is as follows:



To explore the issues of water economy, the data will be collected from primary and secondary sources.A structured interview schedule will be utilized for the collection of primary data from the rural-urban settlements in the area. A separate interview schedule will be prepared for government administrators and owners of private water supply plants. Secondary data will be collected through sources like Census reports, Municipal Corporation reports, National Informatics Centre, District Socio-Economic Reviews, different books, relevant articles in journals,newspapers, different websites, and online statistical data sources like Indiastat, etc.

**Proposed Chapter Scheme:**

To explain and attain the results on the objectives, present study is divided into five chapters.

**Chapter One: Introduction**

First chapter will elucidate the background of the study, need of the study, significance of the study, theoretical base of the study, research question that need to be addressed during the course of study, the objectives and hypothesis of the study. The chapter will also introduce the type of research design and methodology involved for the present study. In addition, limitations and the organization of the study will be stated.

**Chapter Two: Review of Literature**

The second chapter will be dedicated to review of literature focusing on different studies undertaken on the issue of water and outcomes of similar studies. This chapter will also explicate the need of the present study in context of previous studies completed by the scholars.

**Chapter Three: Profile of Marathwada Region**

A brief profile of Marathwada regions and the districts within in terms of its historical background, regional setting, spatial expansion, demographic features, and socio-economic characteristics will be provided in this chapter.

**Chapter Four: Investigation into the Water Economy among Rual-Urban Settlements**

Fourth chapter will highlight water economy in general and interpret the data collected from primary sources and from secondary sources. This chapter will investigate into the imbalance of

the water economy among the rural-urban settlements and factors responsible for the same. Moreover it will highlight the effects out of imbalance in water economy.

**Chapter Six: Findings and Conclusions**

The sixth chapter will provide a conclusive discourse of the study and major suggestions based on the findings. Justifying answer to the research question formulated in the beginning of the study/thesis and further scope of research in this or allied areas will be provided in the chapter.

**Limitations of the study:**

The study is confined to the water-stressed region of Maharashtra State i.e. Marathwada region. Results of the study are only confined to the rural and urban settlements from the Marathwada region only.

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